

-continued

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<220> FEATURE:
<223> OTHER INFORMATION: Synthetic Polypeptide

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We claim:

1. A reagent comprising:

(a) a heterodimeric peptide comprising an epidermal growth factor receptor (EGFR)-specific peptide QRHKPRE (SEQ ID NO: 1) and an epidermal receptor growth factor 2 (ErbB2)-specific peptide KSPNPRF (SEQ ID NO: 2), or a multimeric form of the heterodimeric peptide, wherein the heterodimeric peptide specifically binds to EGFR and ErbB2; and

(b) at least one detectable label, at least one therapeutic moiety, or both, wherein the label, the therapeutic moiety, or both, are attached to the heterodimeric peptide or the multimeric form of the heterodimeric peptide.

2. The reagent of claim 1, wherein the EGFR-specific peptide and the ErbB2-specific peptide are joined by one or more linkers.

3. The reagent of claim 1 or 2, wherein the detectable label is attached to the peptide by a linker.

4. The reagent of claim 2 or 3, wherein the linker has a length of about 60 Å.

5. The reagent of any one of claims 2-4, wherein the linker is attached at the C-terminus of the EGFR-specific peptide and at the C-terminus of the ErbB2-specific peptide.

6. The reagent of any one of claims 2-5, wherein the linker is a peptide, an aminohexonic acid, or a polyethylene glycol.

7. The reagent of any one of claims 2-6, wherein a terminal amino acid of the linker is lysine or a lysine is added at the end of the linker.

8. The reagent of any one of claims 2-7, wherein the linker comprises the amino acid sequence (GGGSK) set forth in SEQ ID NO: 3, the amino acid sequence (GGGAGGG) set

forth in SEQ ID NO: 28, or the amino acid sequence (GGGAGGGK) set forth in SEQ ID NO: 29.

9. The reagent of claim 6, wherein the polyethylene glycol is triethylene glycol (PEG3 or E3).

10. The reagent of any one of claims 1-9 comprising at least one detectable label attached to the peptide or attached to the peptide via the linker.

11. The reagent of any one of claims 1-10, wherein the detectable label is detectable by microscopy, photoacoustics, ultrasound, or magnetic resonance imaging.

12. The reagent of claim 11, wherein the label detectable by microscopy is fluorescein isothiocyanate (FITC).

13. The reagent of claim 11, wherein the label detectable by microscopy is Cyanine 5 (Cy5).

14. The reagent of claim 11, wherein the label detectable by microscopy is Cyanine 5.5 (Cy5.5).

15. The reagent of claim 11, wherein the label detectable by microscopy is near-infrared (NIR) fluorescent dye 800 (IRDye800).

16. The reagent of any one of claims 1-15, wherein at least one therapeutic moiety is attached to the heterodimeric peptide or a peptide monomer of the heterodimeric peptide.

17. The reagent of claim 16, wherein the therapeutic moiety is a chemotherapeutic agent.

18. The reagent of claim 16, wherein the therapeutic moiety is a micelle or provided in a micelle.

19. The reagent of claim 18, wherein the micelle is an octadecyl lithocholate micelle.

20. The reagent of claim 18 or 19, wherein the micelle is pegylated.

21. The reagent of any one of claims 18-20, wherein the micelle comprises carboplatin and paclitaxel; cisplatin and